

(5.5) Solving Problems Using Quadratic Relations

1. Convert to **standard form**:

a)  $y = -(x + 4)^2 + 10$

b)  $y = 3(x - 5)^2 - 7$

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(5.5) Solving Problems Using Quadratic Relations

1. Convert to **standard form**:

a)  $y = -(x + 4)^2 + 10$

$y = -(x^2 + 4x + 4) + 10$

$y = -x^2 - 4x - 4 + 10$

$y = -x^2 - 4x + 6$

Standard Form  
y-int = -6  
a value = -1

b)  $y = 3(x - 5)^2 - 7$

$y = 3(x^2 - 10x + 25) - 7$

$y = 3x^2 - 30x + 75 - 7$

$y = 3x^2 - 30x + 68$

(h, k) (5, -7)  
a = +3  
y-int = +68

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2. Find the equation, in **vertex form**, if the zeros are -2 and 10 and the y-intercept is 5.

For vertex form we need: \_\_\_\_\_

When we have the zeros, we start with \_\_\_\_\_ form.

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2. Find the equation, in **vertex form**, if the zeros are -2 and 10 and the y-intercept is 5.

$y = a(x - s)(x - r)$

$5 = a(-2)(10)$

$5 = -20a$

$a = -\frac{1}{4}$

For vertex form we need: \_\_\_\_\_

When we have the zeros, we start with **factored** form.

$\frac{s+r}{2} = \frac{-2+10}{2} = \frac{8}{2} = 4$  x vertex

$y = -\frac{1}{4}(x+2)(x-10)$

$y = -\frac{1}{4}(x^2 - 8x - 20)$

$y = -\frac{1}{4}x^2 + 2x + 5$

$y = -\frac{1}{4}(x-4)^2 + 9$

(h, k) (4, 9)

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Example 4 p.289

Next Cup

Revenue = (Price)(# of cups sold)

Rev = (\$2.60)(200)

= \$520

**Change Price to Max Revenue**

Rev = (\$2.60 - 0.05x)(200 + 10x)

Vertex?

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Example 4 p.289

Next Cup

Revenue = (Price)(# of cups sold)

Rev = (\$2.60)(200)

= \$520

**Change Price to Max Revenue**

Rev = (\$2.60 - 0.05x)(200 + 10x)

Vertex?

$Rev = (-0.05x^2 + 2.60x + 200)$

$\frac{-2.60}{-0.05} = 52$

$\frac{-200}{10} = -20$

$x_v = \frac{52 + (-20)}{2} = 16$

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$$\text{Rev} = (\text{Price})(\# \text{ of caps})$$

$$\text{Rev} = (\$2.60 - 0.05x)(200 + 10x)$$

$$x = 16$$

$$\text{Rev} = (2.60 - 0.05(16))(200 + 10(16))$$

$$\text{Rev} = (2.60 - 0.80)(200 + 160)$$

$$\text{Rev} = (1.80)(360)$$

$$\text{Rev} = \$648$$

*# of price changes (16), max rev 648*

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$$\text{Rev} = (\$2.60 - 0.05x)(200 + 10x)$$

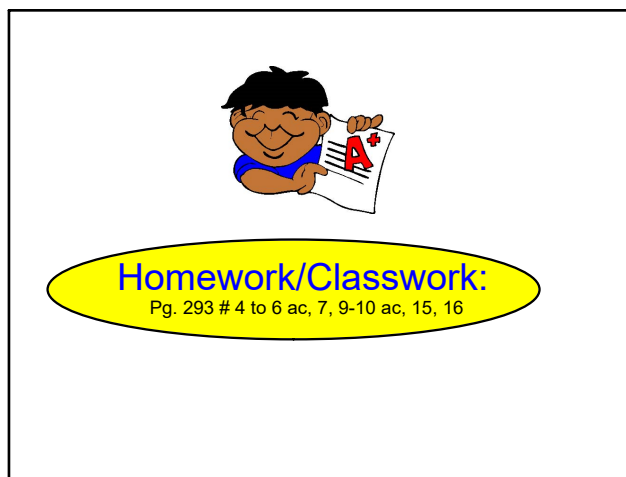
$$\text{Rev} = 520 + 26x - 10x - 0.5x^2$$

$$y = -0.5x^2 - 16x + 520 \text{ - STANDARD}$$

Vertex Form  $a = -0.5$

$(16, 648)$   
h k  
VERTEX  $y = -0.5(x - 16)^2 + 648$

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